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Experts Say Satellite Can Detect Soviet War Steps

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A likely major use of the satellite taken aloft yesterday by the space shuttle is to help warn of Soviet preparations for a nuclear attack on the United States, according to military experts not working for the Government.

By eavesdropping on radio, radar, microwave and other electronic signals from the Soviet Union, the satellite is probably meant to do much more than merely monitor explicit Soviet communications, they said.

These experts say that the satellite could gather data that would allow intelligence agencies to make subtle distinctions in the electronic nature of the signals and thus detect Soviet preparations for nuclear war.

"These satellites can pick up things like changes in Soviet wavelengths as they switch from peacetime to wartime modes," said Dr. Paul Stares, an aerospace expert at the Brookings Institution.

Patterns Can Be Analyzed

In addition to detecting such changes, the satellite might be able to monitor signal strengths in the Soviet Union to detect agitated activity that might presage the initiation of an attack.

"You do pattern analysis," said Dr. Paul Bracken, author of "The Command and Control of Nuclear Forces," a political scientist at Yale University. "If you see a heavy traffic pattern bewteen Moscow center and the missile fields or the naval bases, you start to wonder if something is up."

Such abilities to give advanced warning are well known in military and aerospace circles; they in no way explain the secrecy that has descended on the shuttle mission; these experts said.

While there have been widespread assertions about the kind of satellite believed to be aboard the shuttle and its uses, virtually nothing specific has been disclosed about the physical nature of the satellite and its workings. These specifics are considered especially sensitive by the Defense Department.

The Pentagon had no comment yesterday on the type of payload being carried by the space shuttle.

Reports on Role in Signals

Last month the news media reported that the satellite was meant for signals intelligence, which the military calls sigint. The articles said the satellite was to monitor Soviet missile tests and to eavesdrop on military communications from 22,300 miles above the earth.

The deeper implications of that kind of ability, according to Dr. Bracken and other military experts, go beyond routine monitoring to detecting Soviet preparations for war days and perhaps weeks ahead. Intelligence agenies would then present evidence of Soviet preparations to national leaders.

"For requisite notification to be given, the hostile nation must have arrived at the decision to attack and caused activites to occur that the adversary intelligence services may observe," said Edmund D. Brunner Jr. of the Rand Corporation, in a report on advanced warning written for the Air Force.

"In the few weeks before war day it is likely that contacts between combat units, depots, factories, and military headquarters would increase," he continued. "Bringing all arms, especially strategic nuclear ones, up to full readiness would intensify operation and maintenance activities."

Two Types of Warnings

Dr. Bracken said that warning of nuclear attack was generally divided into two types, tactical and strategic. Tactical warning is mainly via photo satellites that use heat-sensitive infrared telescopes to detect hot exhaust plumes of Soviet missiles as they head for space. Most "early-warning satellites" fall into the tactical category.

In contrast, he said, strategic warning is meant to occur hours, days or perhaps weeks ahead. It relies on signals intelligence satellites as well as other devices and eavesdropping on the state of the Soviet military and its related industries.

Though it is seldom discussed in public, the distinction between tactical and strategic warning is well known in the upper echelons of the American military and the civilian executive branch. For instance, the Rand report for the Air Force is part of a larger secret study entitled "The Role of Strategic Warning in Conflict Management."

Dr. Bracken said that upon receipt of signs of Soviet war preparations, the activity of many American military sensors would probably be heightened and adjusted in an attempt to make strategic warning as certain as possible.

Orbits Might Be Changed

"In a crisis things would switch from a general surveilance to a warning mode," he said. "Your sigint satellites might look for certain frequencies and not others. Or a satellite for monitoring missile tests might have its orbit changed to look at real missile fields. On earth, radars could be repointed from Soviet testing zones to the north pole."

Dr. Bracken said one danger of strategic warning was that by definition it was uncertain. As a Rand paper by Victor G. Jackson put it, strategic warning is "notification that the enemy has probably made the decision to attack but that decision may be tentative, conditional or revocable, and in any case the attack has not yet been initiated."

Another danger, Dr. Bracken said, is that an escalating "feedback" loop might form between the warning systems of the United States and the Soviet Union. In this, the Russians would monitor some of the changes taking place in American monitoring operations and in reaction might speed their preparations for attack. America might respond in kind. What started as mere brinksmanship, he said, might end in nuclear war. To the best of his knowledge, he added, this potential problem is well understood in the executive branch and great conservatism has always been shown in heightening states of alert.

"Pulling out all the stops might lead to armageddon," he said. "What dampens the system is the prudence and good sense of our leaders."

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One Was Launched in 1972

One of the first sigint satellites to have a enhanced role for strategic warning was launched in 1972 and is known as Rhyolite, according to military experts. As is the case with all sigint satellites, Rhyolite and its successors are operated by the National Security Agency, which monitors radio signals and other communications around the world.

The sigint satellite launched yesterday is reported to have cost $300 million. In contrast, communication satellites for commercial use often cost $50 million.

After its release, the new satellite is to be boosted into an orbit 22,300 miles high. This detail was made public when the space agency reported that a special rocket, known as an inertial upper stage, is an integral part of the payload.

Sigint satellites are the most secret of all the nation's satellites and are thought to have large dish antennas to pick up faint signals from earth. The bigger the antenna, the greater its sensitivity to signals. The nose cones of conventional rockets restrict the size of such antennas, and the military had long looked forward to the arrival of the shuttle's more spacious cargo bay. The speculation in aerospace circles is that the signet satellite launched yesterday has the biggest antenna yet.

The potential size of antennas in space is suggested by a nonsecret project being undertaken for the space agency by the Lockheed Missiles and Space Company. The large antenna, once unfurled in space from the shuttle's cargo bay, will resemble an umbrella nearly twice the size of a football field. This antenna would be so sensitive to low-powered signals from earth that it could pick up broadcasts from radios the size of a wristwatch.